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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/717,758	11/21/2000	Yasuhiro Morinaka	10873.603US01	1970

23552 7590 05/18/2005

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EXAMINER	
VIEAUX, GARY	
ART UNIT	**PAPER NUMBER**
2612	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/717,758	MORINAKA ET AL.	
	Examiner	Art Unit	
	Gary C. Vieaux	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 November 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 9-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *9,10,14 and 15* is/are allowed.

6)☐ Claim(s) *1 and 11-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Amendment

The Amendment filed November 23, 2004 has been received and made of record. In response to the first office action, Applicant has amended claims 1, 9 and 10. Additionally, Applicant has cancelled claims 2-8 and added claims 14 and 15.

Response to Amendment

In response to Applicant's amended title, although the Examiner finds the amended title to be more indicative of the invention to which the claims are directed, the title is still not considered to satisfy the requirement of being clearly indicative of the invention to which the claims are directed. Therefore, a new title is required. The Examiner directs the Applicant towards a title that illustrates the design characteristics of the plural vertical charge transfer paths.

Objections to claims 6 and 7 are withdrawn based on irrelevancy created by a cancellation of the claims.

Based on Applicant's substitute set of original claims and the format of the amended claims, the objection to line spacing of the claims is withdrawn.

Response to Arguments

Applicant's arguments filed November 23, 2004 regarding claims 1, 12, and 13 have been fully considered but they are not persuasive.

Regarding claim 1, Applicant contends (Remarks p.9) that Kiik does not teach or fairly suggest the features of "the read-out amplifier and the horizontal charge transfer path... to be provided at a horizontal spacing that is not larger than the width of the section", the readout amplifiers being "placed directly adjacent to the last stage of the horizontal transfer path", or "pulses can be applied to the transfer electrodes independently from other portions of the vertical charge transfer paths." The Examiner respectfully disagrees.

Kiik is found to teach the read-out amplifier and the horizontal charge transfer path being provided for each section into which the photoelectric conversion region is partitioned along a vertical direction, so as to be provided at a horizontal spacing that is not larger than the width of the section. Figure 5 clearly illustrates a teaching of a read-out amplifier (indicator 108) and a horizontal charge transfer path (indicator 112), which in combination, are not larger than the width of the section into which the photoelectric conversion region (indicator 102, four individual sections) is partitioned. Figure 5 of Kiik is also found to teach the readout amplifiers (indicator 108) being "placed directly adjacent to the last stage of the horizontal transfer path (indicator 112)". Furthermore, Kiik provides a teaching that pulses can be applied to the transfer electrodes independently from other portions of the vertical charge transfer paths, in that Kiik provides for separate storage regions for frame transfer sensors and for isolation regions for interline transfer and TDI sensors (col. 1 line 44 – col. 2 line 18, col. 4 lines 51-56.) Therefore, based on the foregoing findings, the Examiner respectfully stands behind the 102(b) rejection to claim 1.

Regarding claim 11, Applicant contends (Remarks p.10) that the references do not teach or fairly suggest that transfer driving pulses can be applied to independent transfer electrodes. However, neither the language of claim 11 nor independent claim 1 directly provides for transfer driving pulses applied to independent transfer electrodes. Claim 1, as recited by the Applicant (Remarks p. 10) provides "transfer driving pulses can be applied to the transfer electrodes independently from other portions of the vertical charge transfer paths." Morcom is found to teach independent transfer pulses applied independently to the the imaging and storage sections ('616 – fig. 1 indicators $I\Phi_n$ and $S\Phi_n$.) Furthermore, Kiik also provides for a plurality of transfer electrodes that are arranged above the vertical charge transfer paths and are wired such that, at least in bent portions of the vertical charge transfer paths, transfer driving pulses can be applied to the transfer electrodes independently from other portions of the vertical charge transfer paths (col. 1 line 44 – col. 2 line 18, col. 4 lines 51-56.) Therefore, based on the foregoing findings, the Examiner respectfully stands behind the rejection to claim 11.

Regarding claims 12 and 13, Applicant contends (Remarks p. 9) that, as claims that are directly dependent from claim 1, claims 12 and 13 are allowable over Kiik for at least the same reasons as provided in relation to claim 1. For the above stated reasons in relation to claim 1, the Examiner respectfully disagrees and stands behind the rejections.

Applicant's arguments, see Remarks p. 9-10, filed November 23, 2004, with respect to claim 9 and 14, have been fully considered and are persuasive. The 103(a) rejection of claim 9 has been withdrawn.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Kiik et al. (EP #0 866 502 A2).

Regarding claim 1, Kiik teaches a solid-state imaging device, comprising a photoelectric conversion region including (fig. 5), a plurality of photoelectric conversion portions arranged in rows and columns extending in a vertical direction and a horizontal direction (fig. 5 indicator 102; col. 5 lines 22-25, col. 8 lines 10-30), a plurality of vertical charge transfer paths extending substantially in parallel to the columns of the photoelectric conversion portions (fig. 5), a plurality of horizontal charge transfer paths for receiving signals from the respective vertical charge transfer paths (fig. 5 indicator 112) a plurality of read-out amplifiers for receiving signals from the respective horizontal charge transfer path (fig. 5 indicator 108), wherein the plurality of vertical charge transfer paths is arranged at a horizontal pitch A within the photoelectric conversion region, and at a pitch B that is smaller than the pitch A in a portion where the signals are

input into the horizontal charge transfer path (figs. 5 and 6), the pitch B reducing gradually from the photoelectric conversion region toward the horizontal charge transfer region so that the vertical charge transfer paths are squeezed together (figs. 5 and 6), the read-out amplifier (fig. 5 indicator 108) and the horizontal charge transfer path (fig. 5 indicator 112) being provided for each section into which the photoelectric conversion region (fig. 5 indicator 102, four individual sections) is partitioned along a vertical direction, so as to be provided at a horizontal spacing that is not larger than the width of the section (fig. 5), each of the read-out amplifiers is placed in a space that results from the squeezing of the vertical charge transfer paths, so as to be placed directly adjacent to the last stage of the horizontal transfer path (fig. 5 indicator 108), and a plurality of transfer electrodes are arranged above the vertical charge transfer paths and are wired such that, at least in bent portions of the vertical charge transfer paths, transfer driving pulses can be applied to the transfer electrodes independently from other portions of the vertical charge transfer paths (col. 1 line 44 – col. 2 line 18, col. 4 lines 51-56.)

Regarding claim 12, Kiik teaches all the limitations of claim 12 (see the 102(b) rejection to claim 1 supra), including teaching a solid-state imaging device wherein the largest bending angle in the vertical charge transfer paths is not more than 45° (fig. 5.)

Regarding claim 13, Kiik teaches an imaging system, comprising the solid-state imaging device of Claim 1 (see the 102(b) rejection to claim 1 supra), and a signal processing portion that synthesizes output from the read-out amplifiers of the sections of the solid-state imaging device, and corrects the image at joint portions corresponding

to portions where the sections border with one another, so as to display one image (col. 3 lines 18-23.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kiik et al. (EP #0 866 502 A2) in view of Morcom (US #4,835,616.)

Regarding claim 11, Kiik teaches all the limitations of claim 11 (see the 102(b) rejection to claim 1 supra), except for teaching a solid-state imaging device wherein a conducting line that is electrically connected to a plurality of transfer electrodes with which the transfer driving pulse is applied to the vertical charge transfer paths is provided substantially in parallel to the vertical charge transfer paths at least from a photoelectric conversion region to a region in which the vertical charge transfer paths are arranged with less than the horizontal pitch A. Morcom teaches a solid-state imaging device wherein a conducting line (fig. 1 indicators 5 and 7) that is electrically connected to a plurality of transfer electrodes (fig. 1) with which the transfer driving pulse (fig. 1 indicators $I\Phi_n$ and $S\Phi_n$) is applied to the vertical charge transfer paths is provided substantially in parallel to the vertical charge transfer paths in both the imaging and storage sections (fig. 1.) It would have been obvious to one of ordinary skill in the

art at the time the invention was made to employ the conducting lines as taught by Morcom, with the solid-state imaging device as taught by Kiik. One of ordinary skill in the art at the time the invention was made would be motivated to make this combination in order to provide transfer driving pulses to both the imaging ('502, fig. 5 indicator 102) and storage sections ('502, fig. 5 indicator 210.)

Allowable Subject Matter

Claims 9, 10, 14 and 15 are allowed.

Regarding claim 9, the prior art does not teach or fairly suggest a plurality of transfer electrodes that are arranged above the vertical charge transfer paths such that bent portions of the vertical charge transfer paths are positioned below locations between the adjacent transfer electrodes.

Regarding claim 10, the prior art does not teach or fairly suggest a transfer path length on which a transfer driving pulse is applied with predetermined transfer electrodes that are shorter than a transfer path length on which the transfer driving pulse is applied with transfer electrodes that are adjacent to the predetermined transfer electrodes.

Regarding claims 14 and 15, the prior art is not found to teach or fairly suggest elements of the claims from which dependence is derived.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary C. Vieaux whose telephone number is 571-272-7318. The examiner can normally be reached on Monday - Friday, 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 571-272-7308. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner
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Gcv2

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